

VTT Technical Research Centre of Finland

Extreme weather impacts on European networks of transport

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EWENT

Extreme Weather Impacts on European Networks of Transport

Project for the call TPT.2008.1. Assessing disruptive effects of extreme weather events on operation and performance of EU transport system



Business from technology

EASA International Air Safety & Climate Change
Conference (IASCC) September 8-9, 2010

Dr. Pekka Leviäkangas
VTT Transport & Logistics

Bio of Pekka

Chief Research Scientist VTT Technical Research Centre of Finland

Vice-President Jaakko Pöyry subsidiary (JP-Transplan)

Corporate Analyst Finnish Railways (VR Group)

Road Policy Engineer
R&D Manager Finnish Road Administration S-E district

Consultant Finnmap Ltd.

Adjunct professor, University of Oulu, dept. of industrial engineering and
management, *business and investment analysis in transportation*

Adjunct professor, Technical University of Tampere, dept. of logistics and business
information management, *transport and logistics*

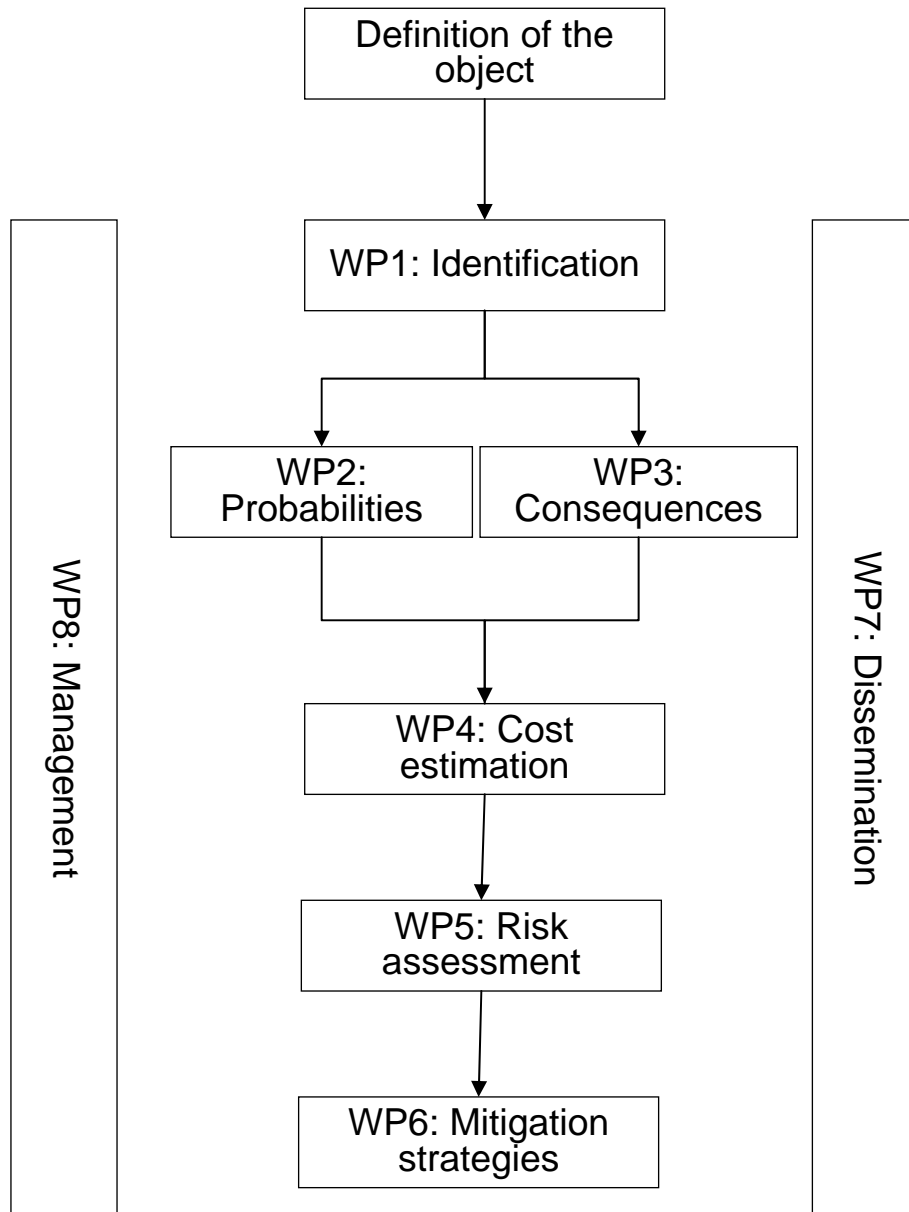


Goal and research strategy

The goal of EWENT project is **to assess the impacts of extreme weather events on EU transport system**. These impacts are monetised. EWENT will also evaluate the efficiency, applicability and finance needs for adaptation and mitigation measures which will dampen and reduce the costs of weather impacts. The methodological approach is based on generic risk management framework that follows a standardised process from identification of hazardous phenomena (extreme weather), followed by impact assessment and closed by mitigation and risk control measures.

EWENT will start this by identifying the hazardous phenomena, their probability and consequences and proceed to assessing the expected economic losses caused by extreme weather when it impacts the European transport system, taking also into account the present and expected future quality of weather forecasting and warning services within Europe.

EWENT will apply **the IEC 60300-3-9 risk management standard framework** all the way through its research process and the project's work breakdown also follows the standard structure (see slide no 4).



OBJECTIVE: Risk management strategy for the EU transport system to prepare for and mitigate the impacts and costs of extreme weather phenomena

WP1: Extreme weather phenomena that have potential internal and external cost impacts on EU transport system; the threshold criteria for weather parameters

WP2: The probability of extreme weather and scenarios for increased probabilities and intensity

WP3: Impact mechanisms for system failures or disturbances (mobility meltdown, reduced safety and security) and operational failures (predictable mobility of passengers and goods); impacts on selected transport system performance indicators

WP4: Estimation of expected costs of extreme weather on time axis, based on identified impacts and scenarios: infrastructure (material damages), operations and traffic (accidents, time delays)

WP5: Evaluation of likely scenarios and most relevant costs; listing of prospective mitigation and adaptive strategies; risk panorama for EU transportation system

WP6: Assessing the effectiveness and preliminary investments required by different mitigation strategies on time axis; e.g. new weather information services, new institutional co-operative models (especially between authority functions and across national boundaries), development needs of standards and engineering guidelines for transportation infrastructures



The consortium

List of participants:

Participant no.	Participant organisation name	Short name	Country
1 (Coordinator)	VTT Technical Research Centre of Finland	VTT	FI
2	German Aerospace Center	DLR	DE
3	Institute of Transport Economics	TÖI	NO
4	Foreca Consulting Ltd	Foreca	FI
5	Finnish Meteorological Institute	FMI	FI
6	Meteorological Service of Cyprus	CYMET	CY
7	Österreichische Wasserstraßen Gmbh	via donau	AT
8	European Severe Storms Laboratory	ESSL	DE
9	World Meteorological Organisation	WMO	UN



Source: DLR/Frank Rehm



By courtesy of Chirs Baker



Source: Aker Arctic

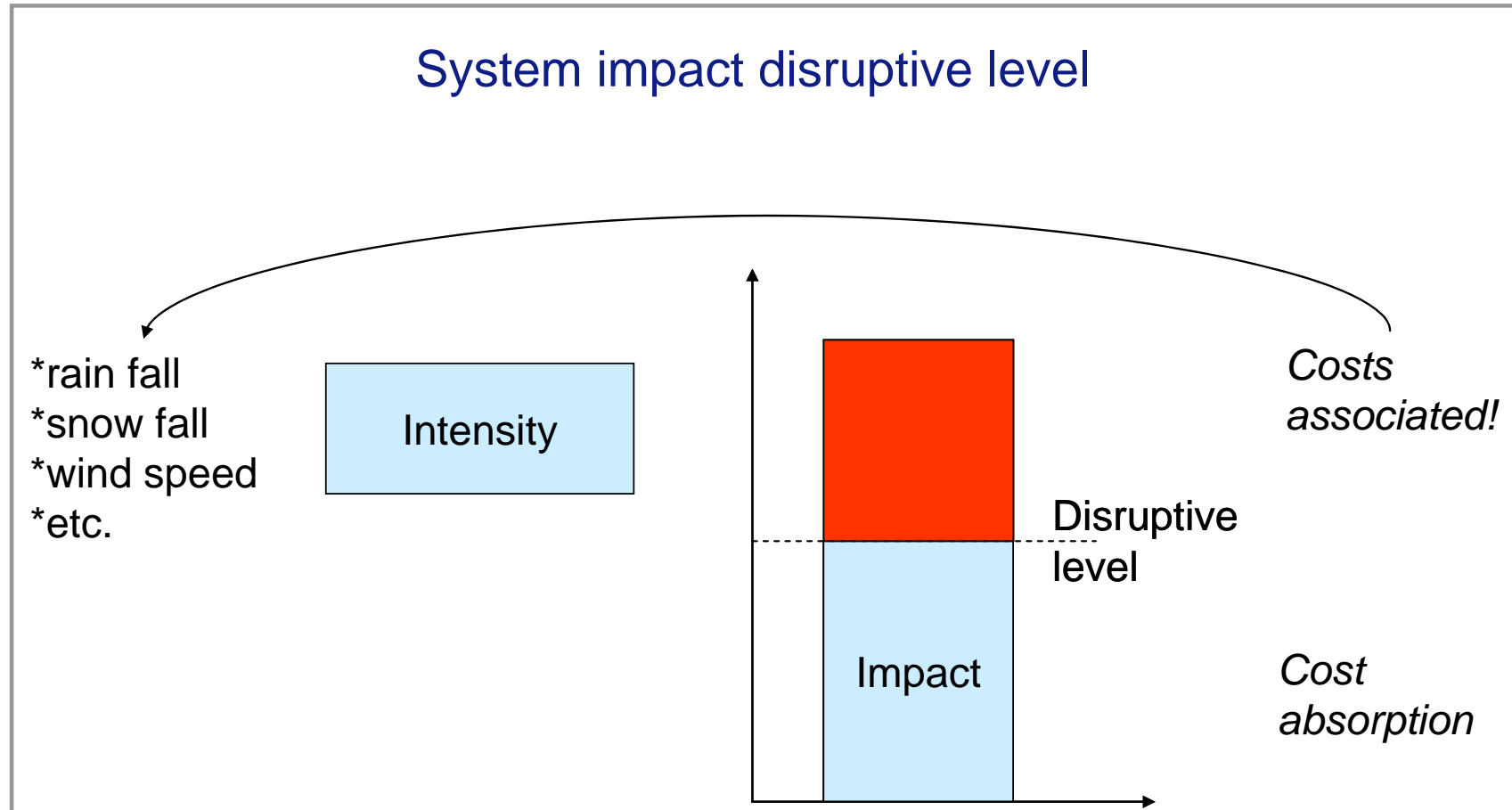
Modal coverage

Depth of analysis	Aviation		Land transport					Marine & waterways		
	Passenger	Freight	Road		Rail		Light	Ocean	Short sea /coastal	Inland ww Freight
			Passenger	Freight	Passenger	Freight				
Detailed	X	X	X	X	X	X				X
Brief							X		X	
Excluded								X		

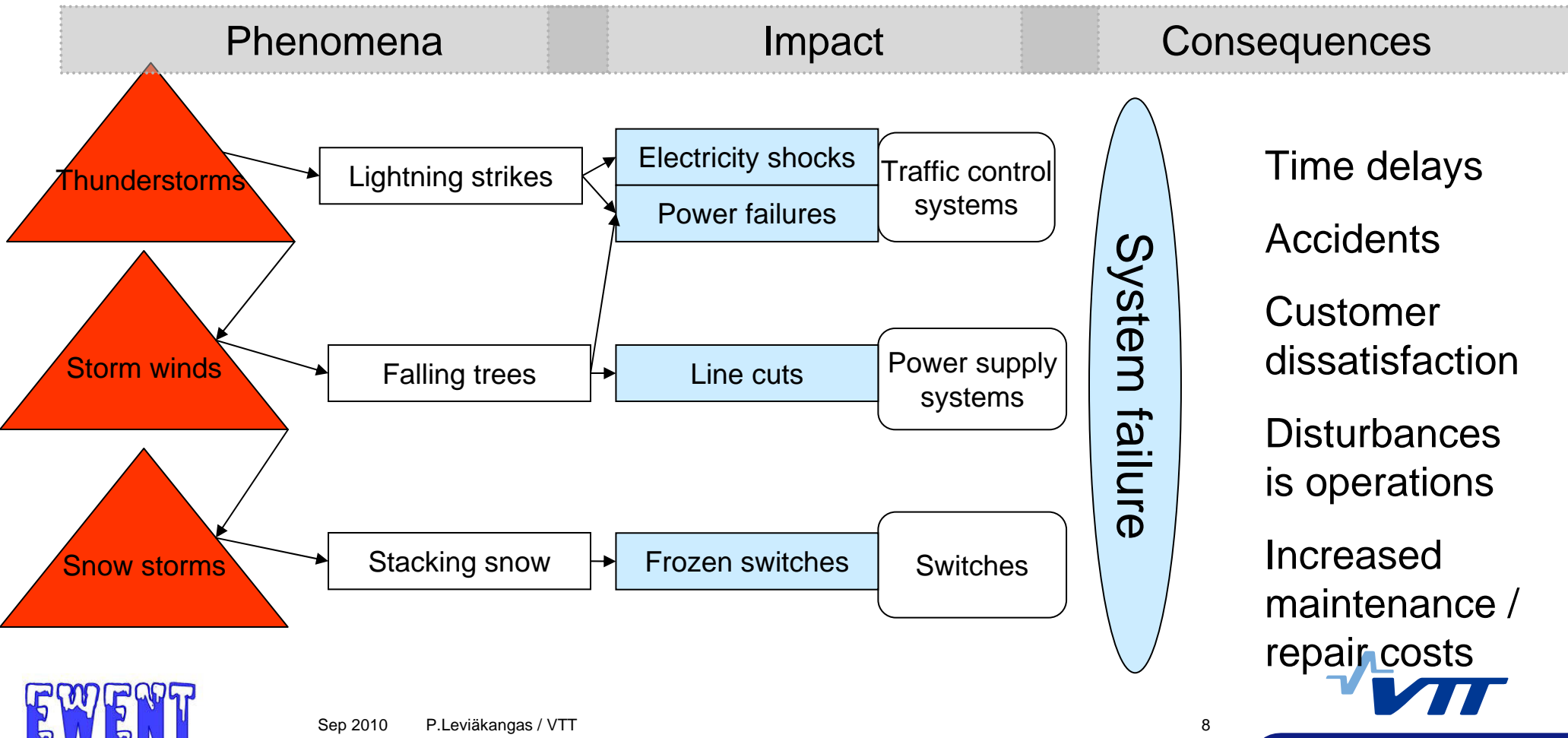
The transport system is viewed from three angles:

- **infrastructure**; these are direct material damages or deterioration of physical infrastructures
- **operations**; these are harmful impacts on traffic safety and transport reliability (both freight and passenger)
- **indirect impacts to third parties**, e.g. supply chain customers and industrial actors.

Cost impact vs. cost absorption



Impact analysis – example railways



Indicators & cost assessment & economic analysis

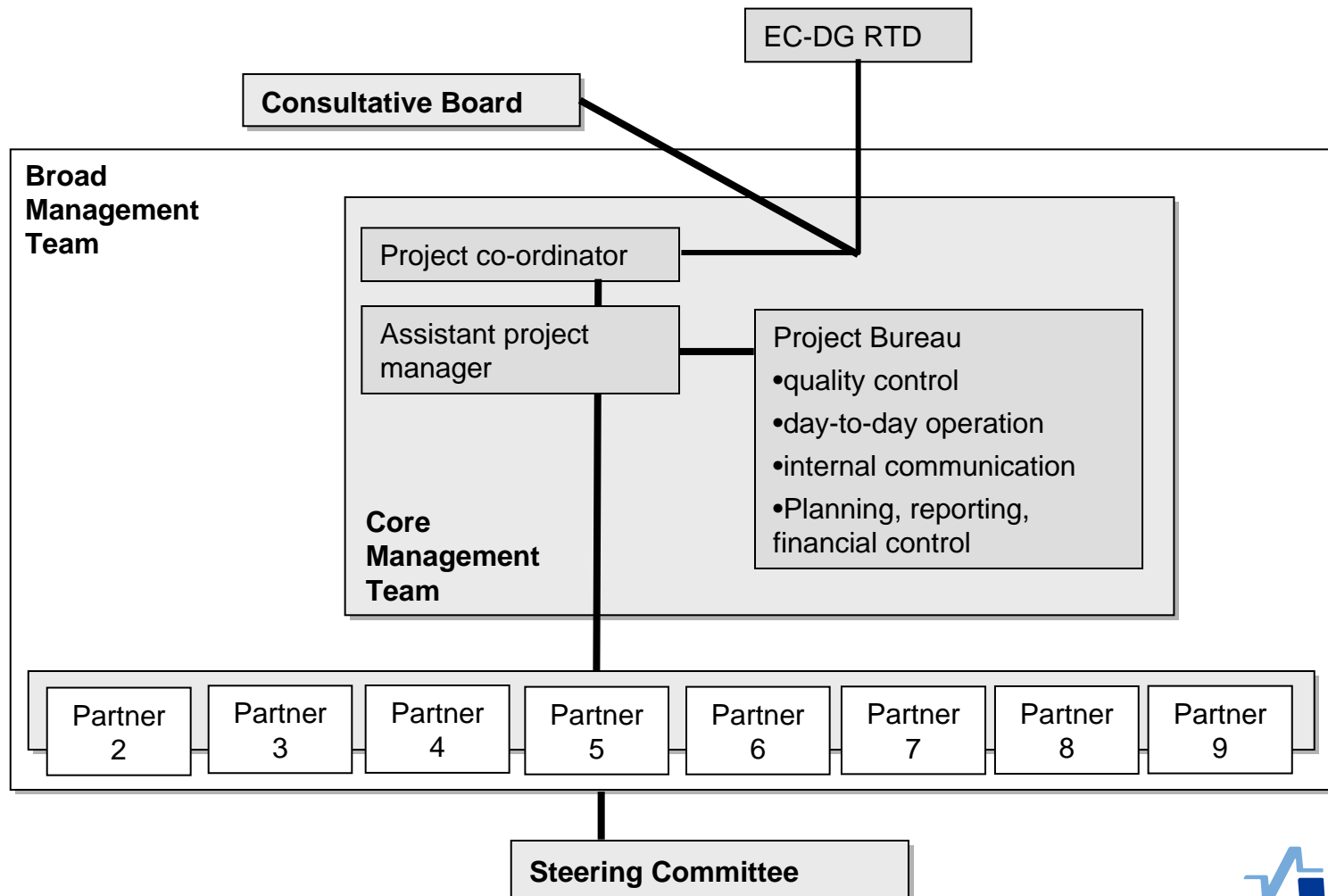
Performance indicator	Cost item	Method for unit values	Source or reference	Notes
Safety	Accidents	WTP	eIMPACT study or alternative EU covering studies	Covers material and human losses (injuries, fatalities)
Time, reliability, profitability, revenues	Time	WTP	eIMPACT study or alternative EU covering studies	Covers both passenger time and freight time; freight time must be upscaled from road transportation to other modes
Reliability, profitability, revenues	Hindered journeys and transports	Opportunity cost of a transport; WTP	Indirect assessment from other studies	The most uncertain cost item to assess
Accessibility, cost (infrastructure investments and repair)	Damage to infrastructures	Historical cost (market cost); some available through insurance sector	Other studies, statistics from selected countries and up-scaling	Up-scaling across EU-27 can be done by e.g. purchasing power parities (ppp) adjustments for countries from where there is no data
Cost (maintenance, operation)	Increased maintenance	Historical cost (market)	Other studies, statistics from selected countries and up-scaling	Up-scaling can be done by e.g. purchasing power parities (ppp) adjustments for countries from where there is no data



Schedule & other info

- The project started in December 2009.
- Duration: 30 months.
- Total budget: ca 2 MEUR

Overall management architecture





Key persons

<u>Policy Officer:</u>	Dr Karsten Krause	European Commission
<u>Coordinator:</u>	Dr Pekka Leviäkangas	VTT
<u>Core Management Team:</u>	Dr Leviäkangas, Ms Molarius, Dr Veikko Rouhiainen, Dr Lasse Makkonen, Ms Ulla Peltonen, Ms Anu Tuominen, Mr Pekka Kulmala – all from VTT	
<u>Broad Management Team:</u>	Dr Leviäkangas, Ms Molarius	VTT
	Dr Frank Rehm	DLR
	Dr Johanna Ludvigsen	TÖI
	Dr Pirkko Saarikivi	Foreca Consulting
	Dr Pertti Nurmi	FMI
	Dr Silas Michaelidis	CYMET
	Dr Juha Schweighofer	via donau
	Dr Pieter Groenemeijer	ESSL
	Mr Dimitar Ivanov	WMO



Key body members

Consultative Board:

Ms. Nancy Saichs, EIB
Mr. Martti Mäkelä, Ministry of Transport Finland
Dr. Cristina Pronello, Politecnico di Turin
Dr. Olaf Novak, Allianz
Mr. Philippe Crist, OECD
(Dr. Karsten Krause European Commission)

"Steersmen":

Dr. Matti Kokkala	VTT
Dr.-Ing. Thorsten Mühlhausen	DLR
Dr. Adriaan Perrels	FMI
QQ, "steersman"	to be nominated



Status in September 2010

- First deliverables issued
- Number of interested parties volunteered to join the network, e.g.:
 - OECD
 - CER
 - SNCF
 - EASA
 - Companies
 - Other research projects
- Project web-site: <http://ewent.vtt.fi/> running



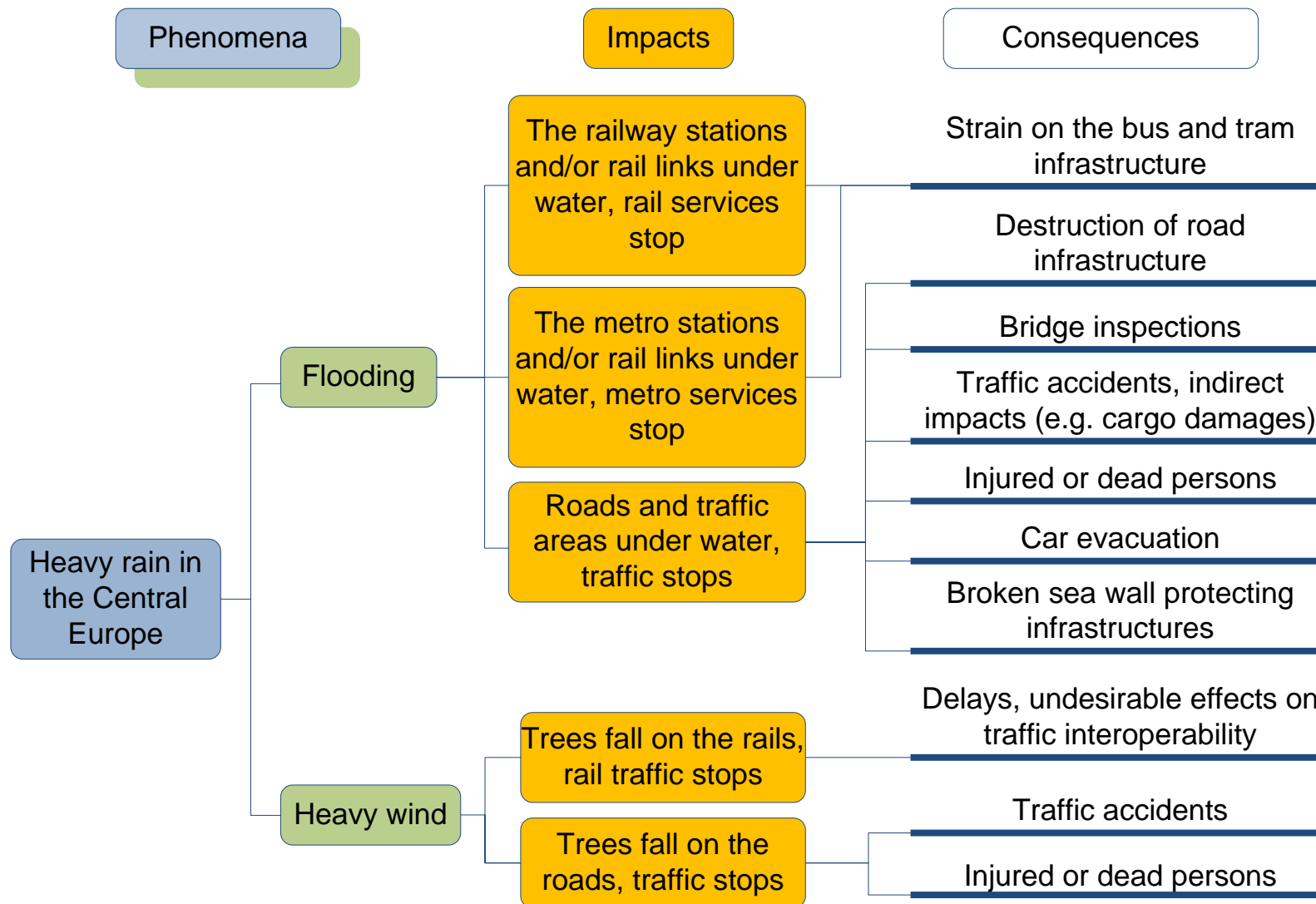
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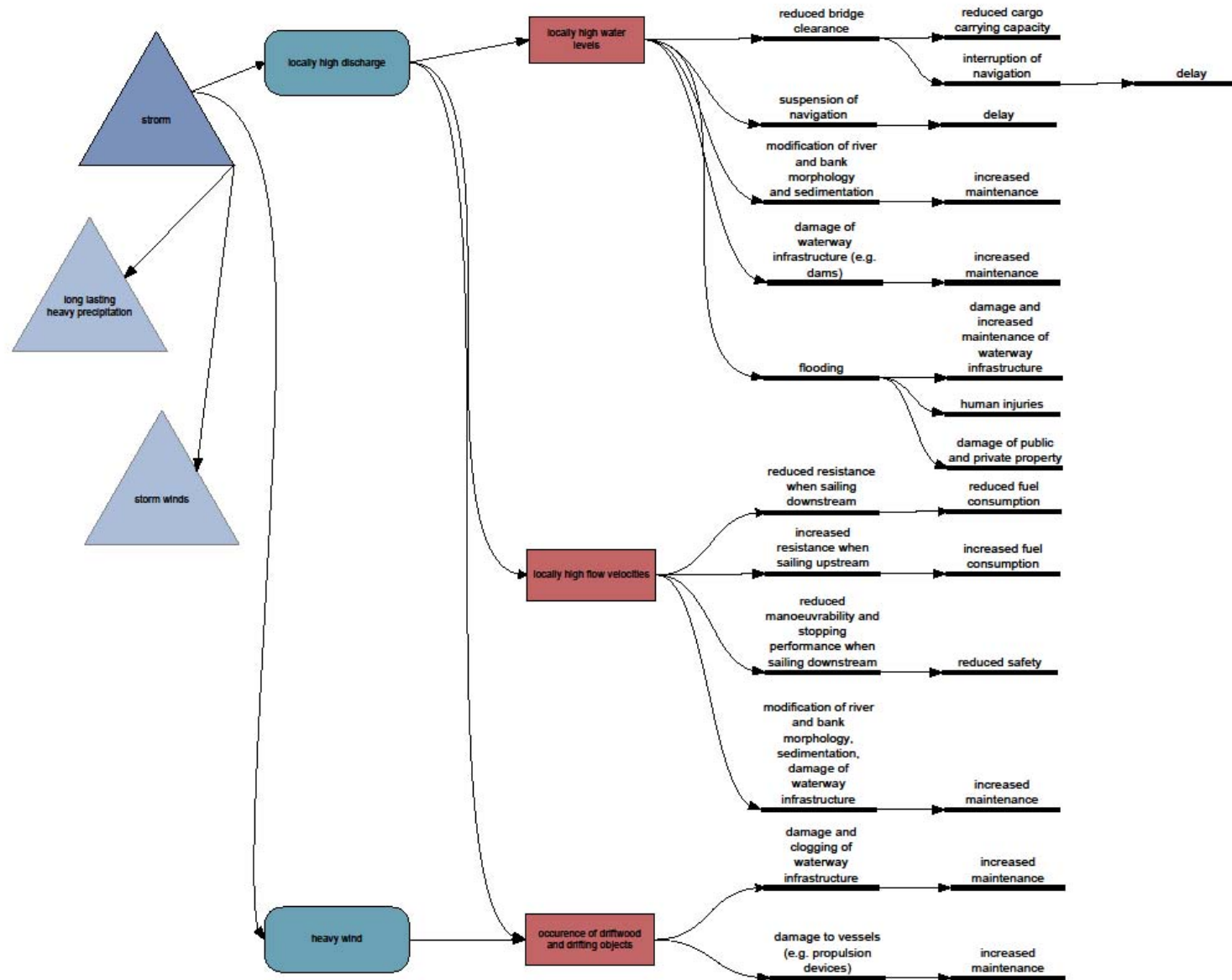
Review on extreme weather impacts on transport systems

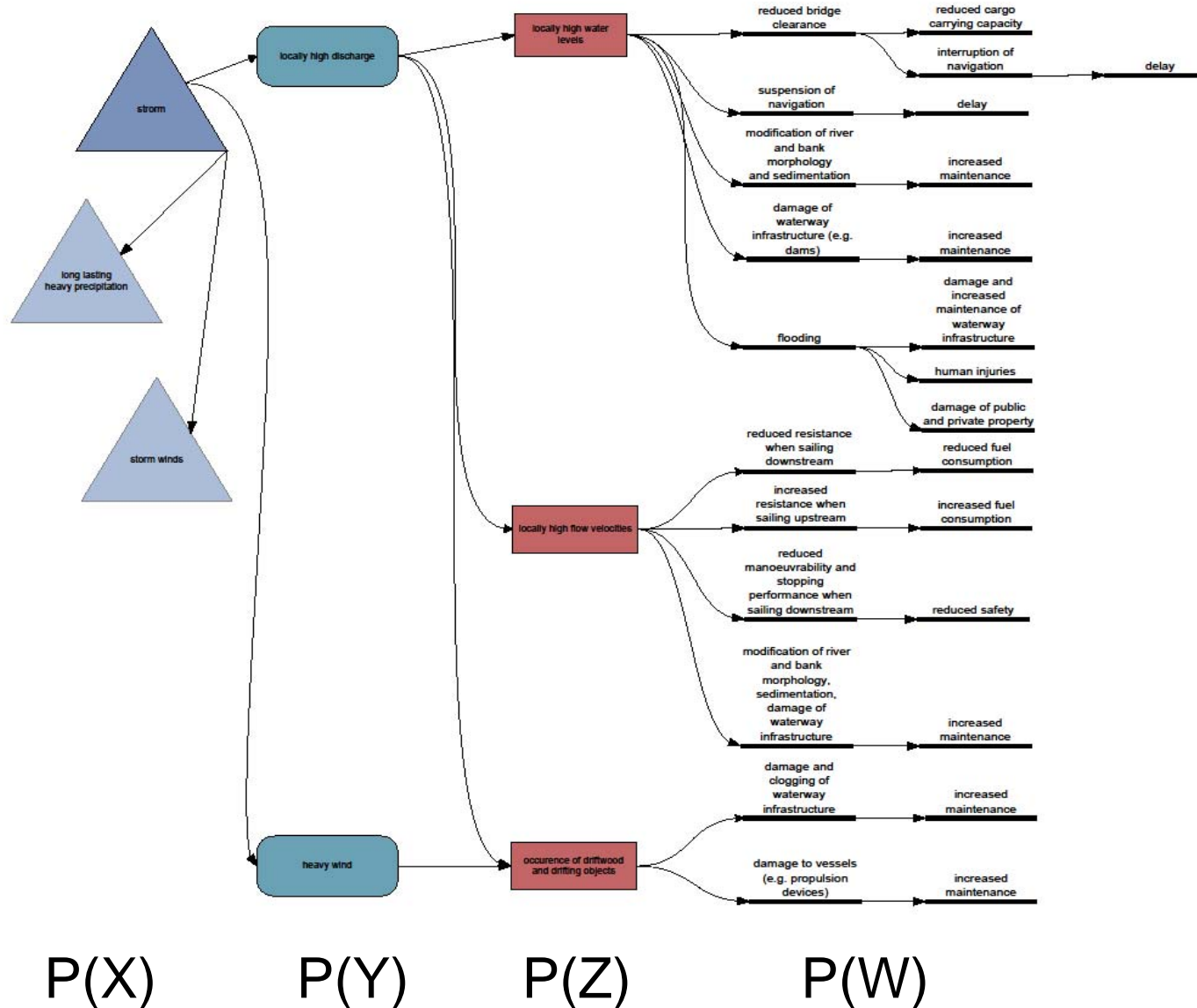
Extreme weather impacts on European networks of transport

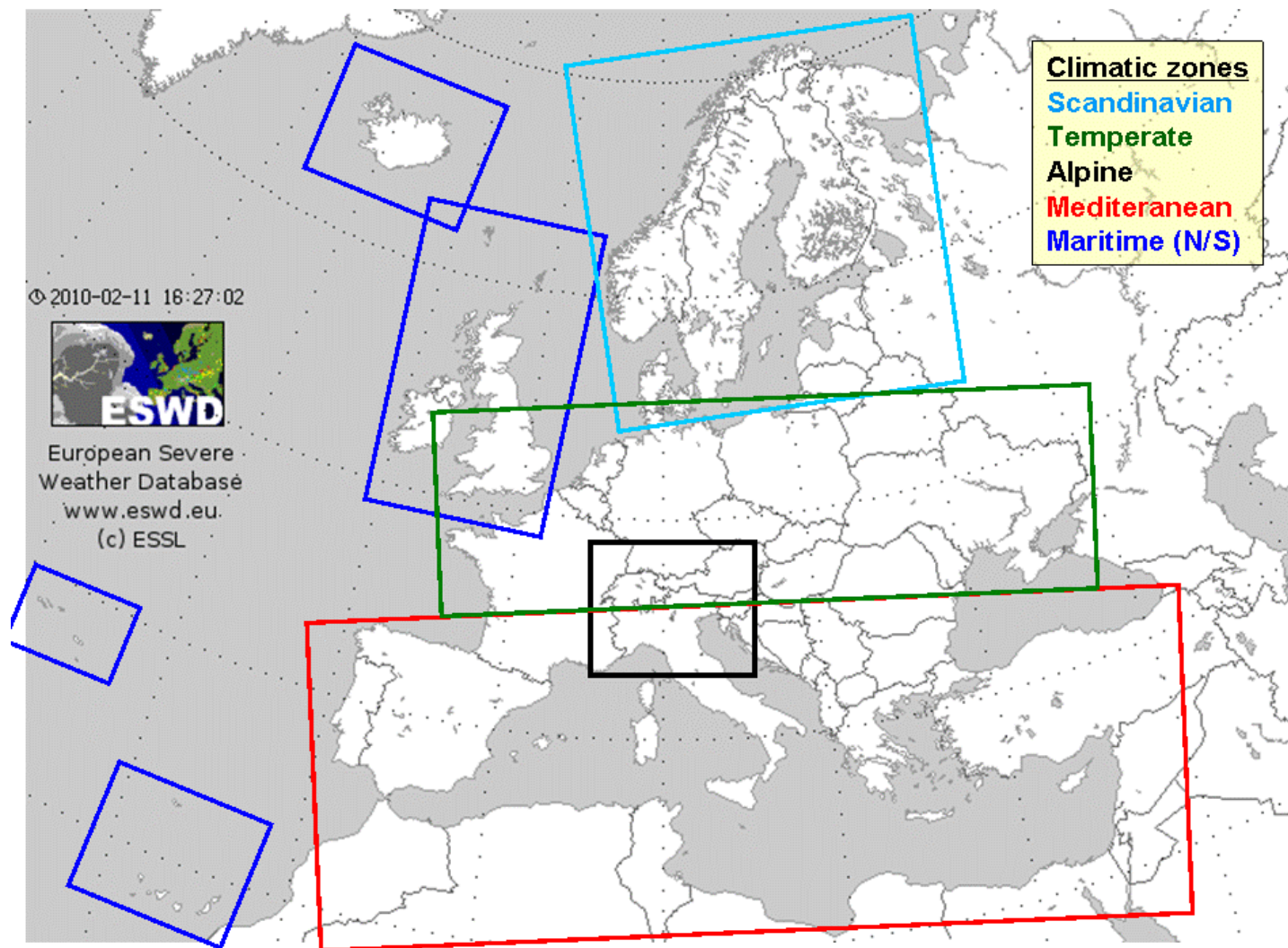
Grant Nr 233919

Co-funded by the European Commission under the 7th Framework Programme,
Transport, Horizontal activities



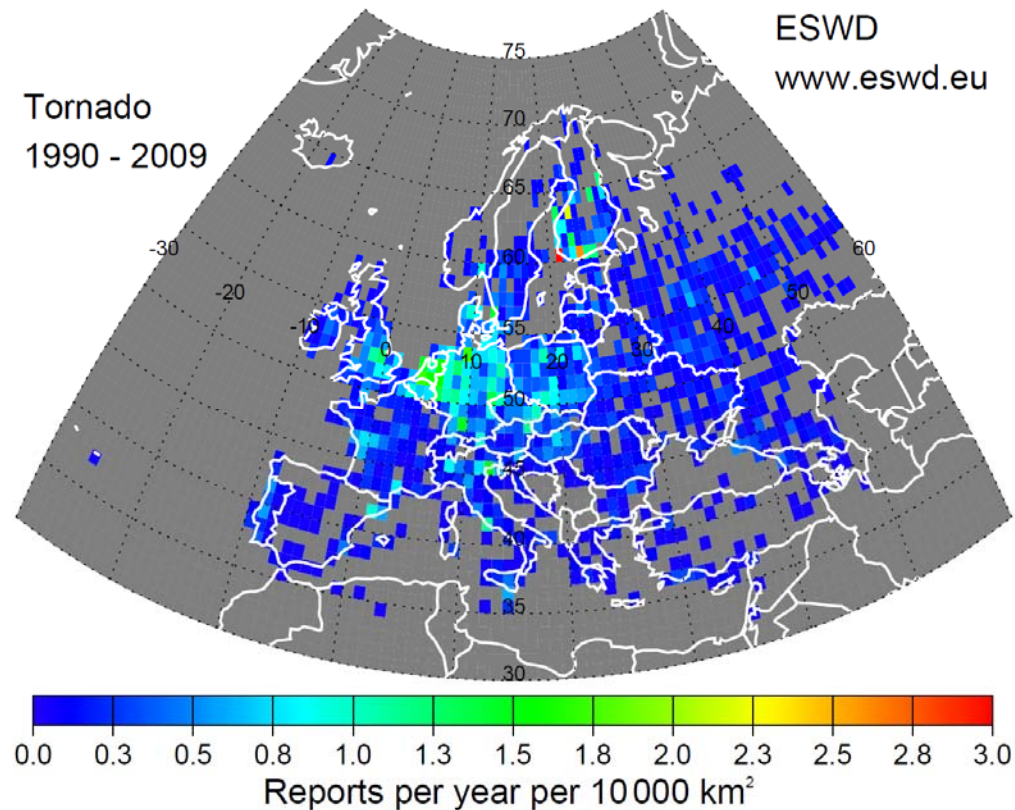






Status of the European Severe Weather Database

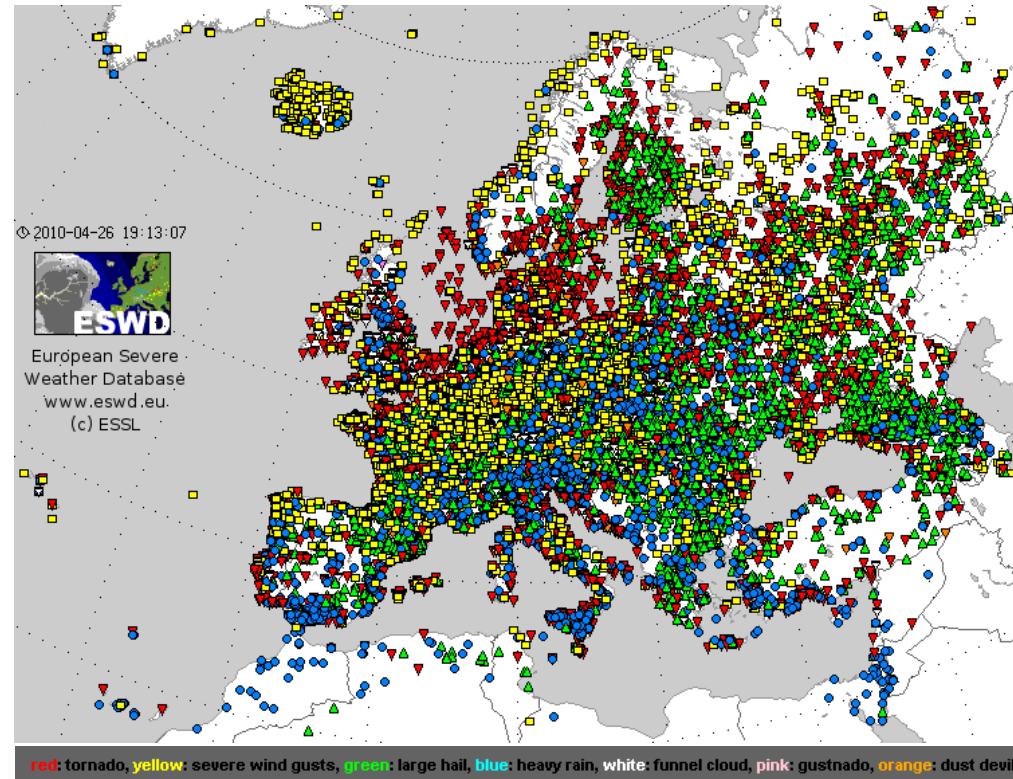
Application, e.g., tornado incidence



Output formats at essl.org/ESWD/:

- **Public:** Map, HTML text table
- **Users:** also ASCII + CSV raw data

Reporting



26/04/2010 $n = 24688$ reports since 1950



NMHS Partner



Media data file including > 200 cases

13.11.2007	Heavy snow	Strong wind	More than ten centimetres of snow	Sweden	Roads			Large numbers of motorists trapped in their cars on snow-blocked road , snowploughs and gritting trucks have been unable to get through, military all-terrain vehicles were able to help get control of the situation	http://www.thelocal.se/9091/20071113/ http://www.thelocal.se/9092/20071114/
24.12.2007	Hail	First flush - "mud flush" (mudslide)	40cm of water on the streets	Spain	Roads	Public	Hail/slush storm in Vélez-Málaga y Torre del Mar. The big amount of hail came down in 15minutes.	Roads A-7 needed to be cut between Vélez-Málaga and Torrox in 7 kilometres. Lot of flooding and stream came with the power in Torre del Mar, Caleta, Algarrobo Costa and Mezquitilla.	27.7.2010 PAK http://www.alertatierra.com/Torrem1207.htm
26.12.2007	Heavy rain		45 litres of water per square metre	Spain	Roads			Heavy rain brings flooding to the Western Costa del Sol. The main A-7 road was closed to traffic. Christmas Eve saw a spectacular hail storm in parts of the Axarquía, causing traffic problems and damage to crops in the area.	http://www.typicallyspanish.com/news/publish/article_14305.shtml#xzz0htj7rH7r
1.1.2008	Heavy snow	Strong wind	wind speed 70km/h	Romania	Aviation	1.-3.1.		Snow storm in the whole country. Many national roads and a highway were closed , , maritime ports from the Black-sea were also closed , the traffic on the Danube-Black sea canal was restricted, delays in road and rail traffic. The Henri Coanda airport and Baneasa airport from Bucharest were closed for several hours, many flights delayed	http://www.hotnews.ro/stiri-esential-2146336-ninsori-puternice-tara-trenuri-intarzieri-mari-curse-aeriene-amanate-porturi-blocate.htm , http://www.romanialibera.ro/actualitate/eveniment/autoritatile-troienite-de-primul-viscol-114724.html , http://stiri.rol.ro/Cel-putin-9-drumuri-nationale-sunt-inchise-trenurile-au-intarzieri-Otopeni-s-a-redeschis-100449.html





Ways to get involved...?

1. Take part in meetings and workshops, dedicated slots
2. Get listed on E-mail & other distribution lists
3. Get involved e.g. in a nominated “Interest Group”
 - This depends on Commission’s views and resources...
4. Be an active contributor (data, views, references, etc.) and hence participate the real work

Other projects with similar focus

- WEATHER – Claus Doll
- ECCONET - Christophe Heyndrickx
- FUTURENET – Chris Baker
- RegioExAKT – DLR





Exploitation of EWENT's results - examples

- Road concession companies:
 - Maintenance preparedness, ensuring flow through
- Road, rail and airport runway maintenance contractors:
 - Fleet and personnel capacity for peaks, high capacity equipment
- Transport operators and logistic service providers:
 - Contingency planning, risk management
- Bulk logistics (IWW):
 - Planning of load capacities, fleet technology development



Exploitation of EWENT's results – examples (2)

- Industry:
 - Plant locations, supply chain risk management
- Infrastructure managers:
 - Maintenance strategies, engineering standard setting, long-range planning
- Safety authorities:
 - Preparedness strategies and planning for exceptional situations
- Insurance business:
 - Risk premiums for weather-related incidents
- Project financiers:
 - Project risk management

